Brief Report: Use of an antecedent procedure to decrease night awakening in an infant: A Replication

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Borowski, Hunter, and Johnson (2001) found that an antecedent strategy such as white noise could decrease sleep awakenings for infants in the natural home environment. This study attempts to replicate the findings using an ABAB reversal design. A five month and one week old child, who had difficulty with waking an average of four times per night, was placed on a white noise program. This program consisted of the parents placing a FamilyCare air purifier and ionizer next to the infants crib and turning the machine on just before the infant parents began to rock the infant and then place the infant in the crib for sleep. This antecedent procedure was successful in reducing the number of infant wakening to 1.3 episodes/ night.
Keywords: Infant sleep, nightime wakening, stimulus/antecedent control procedure, behavioral intervention, replication.

Introduction

As a greater reliance on functional assessment is occurring in behavior therapy (Sturmey, 1996), behavioral interventionists are placing growing weight on neutralizing routines and antecedent control strategies as alternatives to contingency management strategies. As part of this trend, a greater emphasis is being placed on establishing positive routines (Adams & Rickert, 1989; Milan, Mitchell, Berger, & Peirson, 1981), neutralizing routines at the onset of problems (Cautilli & Dziewolska, 2004), and antecedent control strategies (Rolider & Axelrod, 1999; Cautilli & Tillman, 2004). This research stretches across many areas but one area of particular importance for new parents is that of sleep.

Establishing a sleep wake cycle in infants is an important part of parenting (Novak & Pelaez, 2004) and typically one of parents' earliest challenges. Sleep problems for typical children are common (Kuhn & Weidinger, 2000). One of the earliest interventions tried was the use of white noise (Borkowski, Hunter & Merele, 2001; Schmidt, 1975). The white noise procedure is the simple use of continuous sounds to block out the occurrence of other sounds and to create an "airy" sound effect (For a complete theoretical analysis of white noise see- Borkowski and colleagues, 2001 but the producer builds on a combination of stimulus control in which sleep is seen as a reinforcer and respondent conditioning. Continued sleep is seen as a factor of behavioral momentum).

Borkowski and colleagues (2001) explored the use of white noise as an antecedent for sleep time combined with scheduled bedtime routines for five infants, who were four months old. They found the intervention helpful in three infants who were bottle-fed but not helpful for the two infants who were breast-fed. This study attempted to replicate their findings in clinical practice with a five month, one week old child.

Method

Participant

The participant was an only child in his family and typically developing. The child was mostly breast feed, however, due to hectic life schedules the parents fed formula at least three times/week. The child was fed between four and six ounces of milk during the last feeding before sleep. The participant was a five month and one week old child with a history of difficulty with waking during the night after his parents placed him in his crib for sleep. The participant was roughly averaging four instances of waking each night. The instances of problems sleeping reached the point of being so severe that the parents brought the participant to the hospital

emergency room in order to determine if a physical problem was present. After the physician told the parents that waking during the night was common, the physician sent the parents and the participant home. Two days later, the infant's parents sought out the aide of the first author by e-mail on the Internet.

Setting

The participant slept in parent's room. The setting was a standard 12x14 room. The room housed one standard crib for the infant and a queen-sized bed.

Apparatus

Initially, the author wanted to use the white noise generator (model #190405, Brookstone); however, parents had difficulty locating the machine. A switch was made to a common air purifier that emitted a similar sound. It was the FamilyCare Air Purifier/Ionizer (model HAP221) turned to the high setting.

Procedure

The experimenter employed an ABAB reversal design. The parents kept individual diaries recording the infants sleep patterns and night awakenings. Baseline data consisted of the sleep diary report from the mother. During the intervention phases, before the parent began to rock the participant to sleep, the parents would turn on the air purifier. Once the child was asleep, he was placed in the crib. Usually, this process was completed by 8:30 p.m. The air purifier ran through the night and the parent turned off the machines the next morning. Initially, the experimenter planned the reversal for three nights. The experimenter instructed the parents that the removal was important because it would allow them to see if the intervention was still needed. The parents decided to lessen the reversal phase to one night after the first night without intervention proved difficult. Normal wake up time for the infant was 6:45 a.m. waking up between 6:20 a.m. to 6:45 a.m. was not scored as night waking for this study.

Interobserver agreement

Hawkins and Fabry (1979) stressed the importance of ensuring interobserver agreement in data collection. Each parent kept a separate book with the number of times that the infant woke up during the course of the evening. The experimenter calculated the interobserver agreement between the parent's books of infant wakening. The experimenter randomly chose four sessions

and compared (two baseline phases and two treatment phases) to assistant scoring. The experimenter scored agreement scored if both parents stated the same number of wakening for that night. The experimenter scored disagreement if the two score differently. Of the 31 days of the study, the numbers matched on 28 compared. Using the (equation of agreements / agreements + non-agreements) multiplied by 100, to calculate the percent of agreement. Thus, 90% coding agreement occurred between the parents.

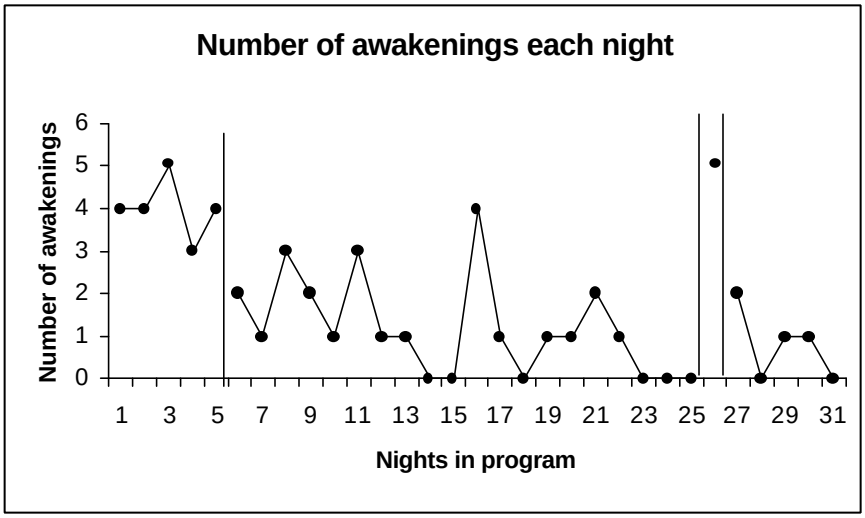

Figure 1. The number of awakenings each night over the course of the study.

Results/Discussion

Figure 1 displays the data for nighttime waking. During the baseline phase, the average instance of wakening for the participant was four episodes /night. In the first intervention phase, the average decreased to 1.3 episodes / night. The return to baseline phase was one data point. It was initially supposed to be three nights for the parents to decide if the participant still needed the program but after the first night in which five instances of wakening occurred, the parents decided on reinstitution of the program. In the reinstitution of the program, the average for awakening each evening was .8.

This study represents a replication of the work by Borkowski and colleagues (2001). The results suggest that antecedent interventions could have a powerful effect in helping to establish sleep and wake routines in infants. Since DeCasper found that infants prefer mother's voice. Mother's voice sounds might represent a good stimulus on a tape recorder to aide in stimulus control. Also, the basis for the preference for maternal and paternal voice appears to be in-utero exposure (DeCasper, Lecanuet, Maugais, Granier-Deferre, & Busnel, 1994; DeCasper & Prescott, 1984; DeCasper, & Spence, 1986). Even more common in-utero is exposure to maternal heart sounds. An interesting question that would seem relevant would be whether white noise is more efficient than say the mother's heart sounds. This question might have potential for even earlier level of sleep scheduling.

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